# Abstract

Clues to the evolution of galaxy clusters can be found in the detailed dynamics of the hot gas and galaxies they contain. In hierarchical models for large-scale structure formation, clusters evolve by accreting small groups of galaxies and other clusters, a process that continues at the present epoch. Merger signs can be well identified using $ASCA$ data, which provide spatially resolved X-ray imaging and spectroscopy. Since merging between clusters is thought to be responsible for significant changes in the physical properties of the ICM, it is very important to define morphological stage of a cluster.

In order to address this issue we have selected three clusters of galaxies with similar characteristics. The sources are A3571 ($z_1$=0.0397), A644 ($z_2$=0.0704) and A2255 ($z_3$=0.0800), which all have high plasma temperature and X-ray luminosity of 1 $\times 10^{45}$ ergs $s^{-1}$. All three clusters show spherically symmetric structure with slight elongation. Among all, A2255 prominently have no-cooling flow and no cD galaxy while both others do. So far, the temperature and metal abundance profiles of three samples have been studied in radial direction. We have performed spectro-imaging analysis and hereby present two-dimensional temperature and abundance maps for A3571, A644 and A2255. Our study results suggest noticeable temperature and abundance variation within the ICM, which is most naturally explained if these clusters are undergoing a merger or experiencing local group infall.

For all three sources non-uniformity of temperature and abundance structure highlights distinct characteristics of merger history of each cluster. A3571 is a one of the well studied sources. It has a average 7.20 keV temperature and 0.39 abundance value. We found a cool-trail like structure with 6.28 keV temperature value, and a very high abundance region 0.51 $Z_\odot$ which locates on the head of the cool trail. Galaxy distribution map shows a substructure in the tail vicinity of the cool-trail. Addition to above all, we record also a vivid arc-shaped hot region which is exactly locating on the head side of the cool-trail in a perpendicular direction. If this structure is not a chance location of hot blobs, it is perfectly fitting in our scenario as a weak-shock front which is a consequence of merger. A644 is a cluster with 7.53 keV temperature and 0.36 solar abundance values

within the ICM. By the spectro imaging method we have defined cool region 6.86 keV in the northern part of the cluster. Abundance map of cluster also show variations around the center. Alignment of the X-ray surface brightness elongation and cool trail is in the same direction, which can be explained with a simple mind by a group infall. A2255 on the other hand is an interesting unusual galaxy clusters with very extend core radius. Its average temperature is 6.68 keV and abundance is 0.30 $Z_{\odot}$. It is one of the clusters that are reported to have an extensive cluster radio halo. Since the life-time of the accelerated particles are relatively short, having a radio halo is considered as evidence of an on-going merger. The center X-ray isophotes show clearly elongation in two directions (NE-SW and E-W) and the ellipticity of the contours diminish gradually in the outer sides of the cluster. Employing the same method of analysis, we obtained a remarkable temperature variations of 5.5 keV to 7 keV for the eastern and the western half of the cluster respectively. Multi elongated central X-ray contours and large-scale temperature variation imply an off-set merger of different mass clusters.